

The geochemical characteristics of basaltic and acidic volcanics around the Myojin depression in the Izu arc

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Around the Myojin Depression, westside of the Myojin-sho caldera in the Izu arc, seamounts are distributed and hydrothermal activity and deposition are found from the Baiyonneise Caldera, one of seamounts at the northern side. Some knoll chains distribute in the eastside of the Myojin Depression, and connect between these knolls. This circulator distribution of seamounts and connected knoll chains considered to the dykes are similar to the geographical features of the Kuroko Depositions in the Hokuroku Region, Northwest Japan (Tanahashi et al., 2008). Hydrothermal activities are also found from the other rifts (Urabe and Kusakabe 1990). Based on these observations, the cruise KT09-12 by R/V *Tansei-Maru*, Ocean Research Institute (ORI), University of Tokyo, investigated in the Myojin Rift. During the cruise, basaltic to dacitic volcanic rocks and some acidic plutonic rocks were recovered by dredge system. Herein, we present petrographical and chemical analyses of these rock samples with sample dredged by the cruise MW9507 by R/V *MOANA WAVE*, and consider the association with hydrothermal activities and depositions.

Dredges during the cruise KT09-12 were obtained at the Daini-Beiyonneise Knoll at the northern side, Daisan-Beiyonneise Knoll at the southern side, and the *Dragonborn Hill*, small knoll chains, at the southeastern side of the depression. Many volcanic rocks are basalt, and recovered mainly from the *Dragonborn Hill*. Andesite and dacite was recovered from the Daini- and the Daini-Bayonneise Knoll. Tonalites were recovered from the Daisan-Bayonneise Knoll.

Volcanic rocks from the rift zone including the Myojin Rift show across-arc geochemical zonation, depleted in the volcanic front (VF) side and enriched in the reararc (RA) side. The *Dragonborn Hill* is distributed near the VF, and depleted geochemical characteristics similar to the volcanics from the volcanic front. On the other hand, the *Dragonborn Hill* basalts show more than 6 wt% and 0.88 wt% of MgO and TiO₂ and less than 50 wt% of SiO₂. The range of volcanics from each dredge sites show narrow variation, less than 1 wt% of SiO₂. Other basalts from the Myojin Rift also show the same geochemical characteristics. These characteristics are different from the volcanics from the VF, e.g. that of Sumisu caldera shows more than 50 wt% of SiO₂ and fractional geochemical trends. Tamura et al. (2009) divided the Quaternary rhyolites of the Izu arc into three types based on geochemical and associated crustal characteristics. The R1 rhyolite and shows depleted in high fluid strength elements (HFSE) and rare earth elements (REE). The R2 and R3 rhyolites show enriched in HFSE and REE. They considered that the geochemical differences between the three types of rhyolites are closely related to volcano type and crustal structure, and described that these rhyolites were produced from the melting of intermediate arc crusts heating by dikes from the basaltic volcanoes. However, the composition of the basalts from the *Dragonborn Hill* shows different geochemical characteristics from the VF basalts. Therefore, the magma genesis of these basalts is independent, not directly from the VF volcano by intrusion.

The acidic rocks also show across-arc geochemical variation similar to basalts. Rhyolites recovered near the Myojin Depression show similar geochemical characteristics to R2 by Tamura et al. (2009), and those from the RA side show similar characteristics to R3. We conclude this across-arc variation of rhyolite composition is associated with that of intermediate middle crust and ultimately mantle ones. The mantle under recent Izu arc is considered to show depleted at VF side and enriched at RA side (Haraguchi et al. 2011; Ishizuka et al. 2011).

Keywords: Intra-arc rift zone, Magma genesis, Acidic Volcanism, Hydrothermal activity